

Locational Characteristics of Pioneer Rural Residential Sites in the Lower Wabash Valley

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In this study of a portion of the Indiana frontier, the hypothesis considered was that pioneer (pre-1830) rural residential site patterns were not random, but instead reflected a combination of physical and cultural locational characteristics. The concept is based in the location theory of both geography and economics, as well as the environmental niche concept which has been applied to site analysis in anthropology since at least 1964 (Casagrande and Thompson, 283).

The region considered extends over a portion of the Lower Wabash Valley. The Wabash River flows west-southwest from its headwaters to a point some 30 miles west of Lafayette. From there it begins its 130 mile trend to the south. The area draining into the southern trending part of the river system is defined here as the Lower Wabash Valley. The site surveys developed in this research cover parts of Vermillion, Parke, Vigo, Sullivan, Knox, and Gibson counties in Indiana (Fig. 1a).

Although European settlement in the region began with the French establishment of Vincennes in 1732, rural settlement was minimal during the French (1732-1763) and British (1763-1779) periods. The outlying colonial French sites indicated in the literature included six farmsteads near Vincennes (Esarey, 10). These may in part be the ones noted by Ekberg (88) on the long lots to the west of the Wabash River. Apparently, east of the river, residential structures were lacking on the cropland adjacent to the town. In addition, references have been made to a few other more remote French residential sites in the region (Dean, 35; Hodge, 7).

Change was slow under the British. The post at Vincennes was normally not garrisoned, and the village remained French in character. While some British settlers were attracted to the region, rural farmstead sites were not abundant. Father Gibault noted in 1770 that there were 80 farmers in the Vincennes parish (Somes, 56). Since 67 adult males resided in Vincennes in 1769 (Barnhart and Riker, 170), the rural residential sites in the Vincennes area had increased to a few dozen, at most, by 1770.

Empirical evidence supports the view that colonial rural residential sites were rare throughout the region. Not only do the reported

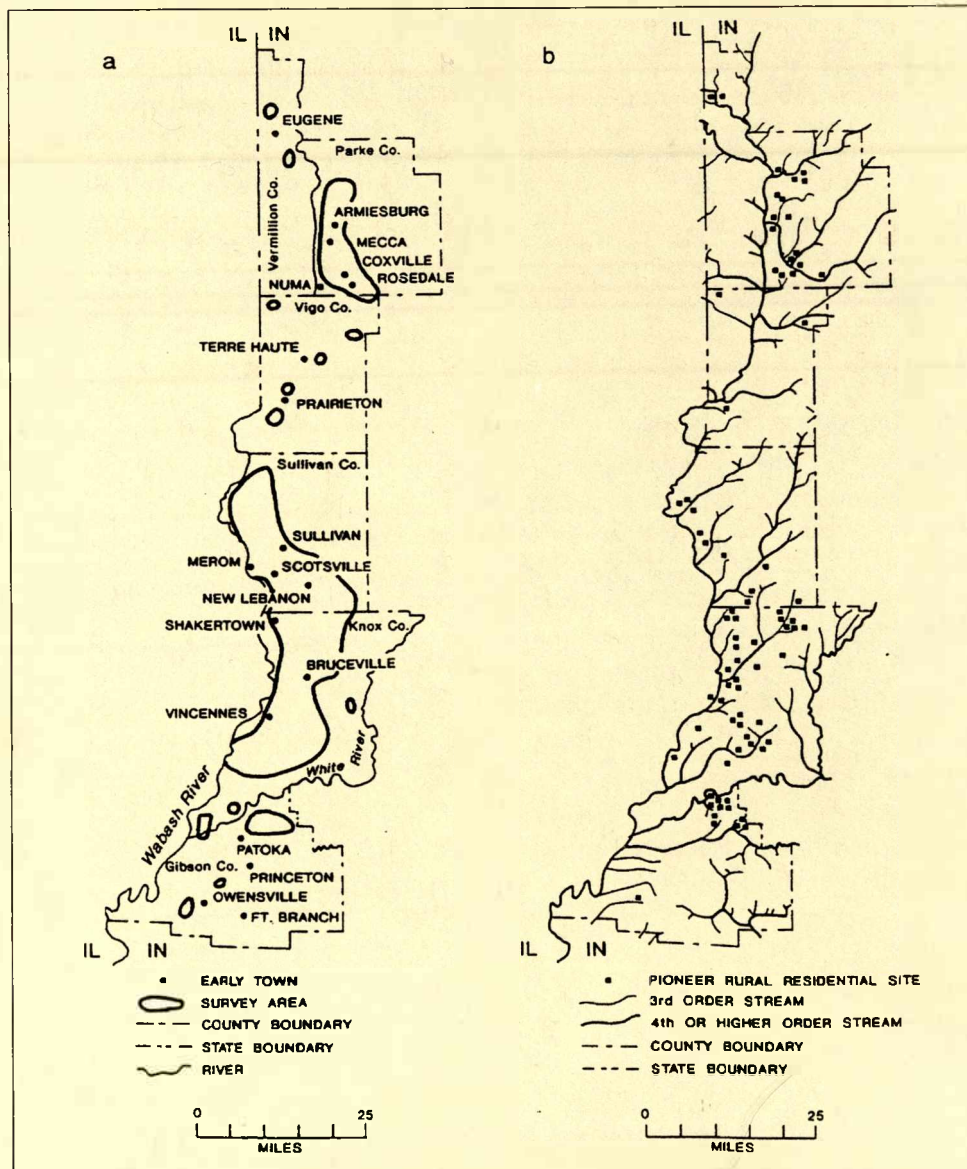


Fig. 1 The Lower Wabash Valley Research Region.

a. Pioneer Settlements and Areas Surveyed.

b. Pioneer Rural Residential Sites and Higher Order Streams.

first settlers uniformly postdate the colonial period outside Knox County (which contains Vincennes), but none of the 324 sites located in the present research could be dated from the colonial periods by either documentation or material culture.

The situation changed in 1779 with George Rogers Clark's victory at Vincennes. Pioneer settlement along the River DuChesne southeast of Vincennes began soon after, and rural sites with documented dates of 1783 and 1784 have been identified there. Elsewhere in the region,

pioneer rural occupation expanded northward from the Ohio River Valley after 1779. However, rural settlement remained relatively sparse until the War of 1812 ended the risk to isolated settlers during periods of Indian unrest. Between 1815 (the end of the War) and 1830, pioneer rural settlement developed extensively in southwestern Indiana.

Research Hypothesis and Objectives

This research was undertaken to define and analyze the locational characteristics of the region's pioneer rural residential sites. It was hypothesized that the site locations were not random, but instead exhibited a specific set of locational characteristics. Once they were identified, it was thought that some of the reasons for the settler's locational choices could then be inferred from the site characteristics. A preliminary (1991) analysis of various types of pioneer settlement in the region suggested that this approach would be productive (McGregor, 1994).

The Site Surveys

Between 1988 and 1993 portions of six Lower Wabash Valley counties were surveyed (Figure 1a). Within those counties, the selection of survey areas was based primarily on the local historical literature which served to identify the areas of early settlement.

Once an area was selected for the survey, both the specific locations identified in the literature and those reported by local respondents were examined in the field. Landscape features such as early cemeteries and structures, related higher ground, out of place ornamental plantings, and anomalous soil characteristics served to further guide the field work. The presence of early survey parcels predating the public land survey was also important, since early sites tended to be located on such land holdings. As field experience was developed, both the ability to "read" the landscape and the rate of pioneer site discovery improved.

Where vegetation such as forest, brush, or pasture obscured the surface, the locality was bypassed unless an important site was known to have been present. The research required a sizeable early site sample rather than a thorough survey of every prospective area.

A total of 324 historic sites was located. Among them, 75 (Fig. 1b) were demonstrably occupied during the pioneer period (c.1780 to 1830), largely based on recovery of an earthenware ceramic assemblage characteristic of the latter decades of the 18th century and the early decades of the 19th century (Deetz: Gums, 106; Noel Hume, 123-131).

Creamware (c. 1765-1820), which has an ivory or cream colored tint, and bluish-white pearlware (c. 1780-1830), were basic to early site identification. As expected (Noel Hume, 130-131), pearlware was the most abundant of the pre-1830 ceramics in the field area.

Pearlware decoration (Fig. 2) included molded rims with green or dark blue highlighting, transfer prints which were typically blue, and painted polychrome designs in varying color combinations selected

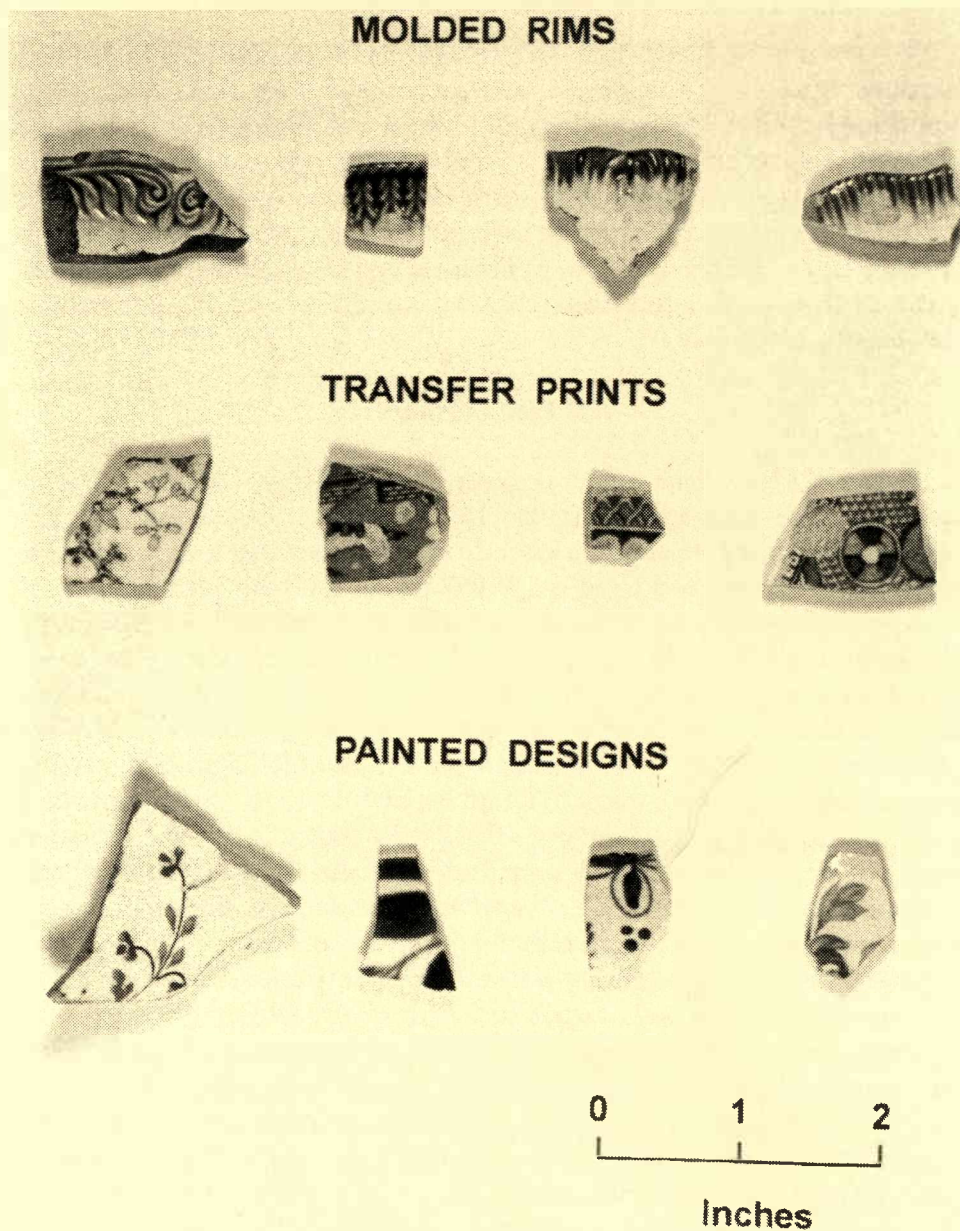


Fig. 2 Examples of Pearlware Decoration.

from blue, green, ocher, dark red, brown, and black. Transfer techniques permitted complex designs etched on copper plates to be inked, the ink pattern to be applied to paper, and the pattern to be transferred from the paper to a ceramic object.

Refined white earthenware (post 1812), which largely replaced creamware and pearlware production by the 1830s, was also recovered on some of the pioneer sites. Although the appearance and decoration of the early (pre-1830) whiteware was similar to pearlware (Price, 26), its white color was distinctive.

Lead glazed redware was also diagnostic of the early sites. Its production was widespread in the English colonies from the beginning of settlement, and followed the early migration streams into the Midwest. It remained the predominant plain, utilitarian pottery until the more durable stoneware products with their safer salt and clay slip glazes became locally available. In the Lower Wabash Valley, stoneware production began in the 1820s (McGregor 1996, 41), and largely replaced redware use in the area by the 1830s.

Tin glazed earthenware (Delftware) also fit the early assemblage, but it was rare in the early site ceramics of the research area. A similar scarcity of Delftware was apparent in the ceramics of the nearby pioneer Whitley site in Eastern Illinois (Gums, 106).

Historical documentation was sufficient to identify and accurately locate only four of 75 sites and exterior architecture only one. The four surviving pioneer log structures located during the surveys were so modified that they supplied little visual evidence of their early origin. Only the severe deterioration of one structure exposed its underlying log construction.

Pioneer Site Characteristics

The physical and human environmental characteristics related to the location of early British and American rural residential sites have been suggested in a diverse literature (Table 1). The cited topographic features included the landform type, position in the local relief, flood risks, magnitude and direction of slope, as well as distance to water, to water transportation, and to mill streams. Forest characteristics, patterns of woodland and prairie, and game availability were noted locational aspects of the biosystem. Soil characteristics and, more specifically, soil fertility were also described. Cultural locational characteristics included road transportation, neighborhood population clusters, area settlements, and site aesthetics.

Most of the cited sources treated the residential site location characteristics as a peripheral issue. Among them, only Lukezic (1994) attempted to deal comprehensively with rural residential (plantation) location. The scarcity of extensive historical site surveys

Table 1
Cited Locational Characteristics

<u>Site Characteristic</u>	<u>Reference</u>
Physical	
<u>Topographic</u>	
Type of landform	Butzer 1971,411; House 1977,250; Lemon 1979,134; Rice 1970,157.
Position in the local relief, related flood risks	Clark and Guice 1989,169.
Magnitude and direction of slope	Archer <u>et.al.</u> 1982,311; Mires 1993, 82-83.
Distance to water	Esarey 1947,25; Isaac 1982,33; Lukezic 1994,13; McManis 1964,47.
Distance to water transportation	Lewis, K.E. 1979-80,182; Lukezic 1994, 15; Merrens 1964,24; Trewartha 1946, 591; Wacker 1975,126.
Distance to mill streams	Leach 1966,66.
<u>Biologic</u>	
Forest type, characteristics	McManis 1964 and 1947; Isaac 1982,33; O'Brien and Majewski 1989,61.
Woodland/prairie pattern	Jordan 1975,255, 1979,50-60; Pease 1919,6-7; Price and Price 1981,245; Sauer 1963(1916),13.
Game availability	Pease 1922,2.
<u>Soil</u>	
Type and characteristics	Abernathy 1956,137; Buley 1950,142; Lukezic 1990,1.
Fertility (specifically)	Abernathy 1957,47; Lukezic 1990,3 and 1994,17; Merrens 1964,24; Price and Price 1981,245.
Cultural	
Road transportation	Lewis,K.E., 1979-80,182; Lukezic 1994, 15.
Neighborhood population, settlements	Clark, T.D., 1959,208; Clark and Guice 1989,166; Jordan and Kaups 1989,77; Lukezic 1994,17.
Site aesthetics	Jakle 1977,177; Rice 1970,151.

appears to be one factor which has limited the available comparative data. Further, the regional surveys which have been completed, such as the ones related to the Cannon Reservoir in Missouri (O'Brien), the Savannah River Plant (Williams, 53), the Allatoona Reservoir in Georgia (Williams, 20-21), York County, Maine (Harrington, 31), and the Middle Fork of the White River in Arkansas (Ewen), generally did not provide an analysis of historic site patterning.

While the studies included by Linebaugh and Robinson (1994) in their volume on spatial patterning in historical archaeology are regional in scope, coverage by region, period, and type of site remains very sparse. As a result, it has not been possible to characterize types of site locations despite the recognized need to analyze sites within their "geographic and environmental context" (Adams, 92) and to adopt a regional perspective rather than focus primarily upon individual sites (House, 241). Certainly, there is little basis in the literature to suggest how pioneer rural residential locations varied over time and place, in terms of even the general locational characteristics described in the literature.

In the present research, measurement and other detailed characterization of the location factors relating to pioneer farmsteads was a primary goal. It was not possible to deal directly with all of the factors suggested in the literature, since the research region is extensive and some types of data could not be readily generated.

Specifically, with the resources available, the biosystem at the time of settlement could neither be accurately mapped nor even generalized in terms of forest characteristics, patterns of woodland and prairie, and game availability. The use of the surrogate measures of local and area relief were adopted to suggest the degree of environmental variation and, thereby, the diversity of biological resources near the site. In addition, the amount of local relief at the site was assumed to be related to the quality of the "view" and indicative of site aesthetics.

Also, some sites may have been selected near the margin of different topographic environments in order to provide varied agricultural opportunities. For example, a farmstead may have been placed on a bluff or adjacent to it on the upland to provide easy access to both upland cropland and grazing areas on the floodplain. This appears to have been the case at some of the sites, since 11 were located on the bluffs and three on upland locations adjoining the bluffs. However, it is also possible that the landholdings related to those residential sites may not have encompassed both upland and floodplain areas.

The pioneer road and trail patterns could not be accurately defined for the field area, since the available historic maps and other data sources supplied little locational data concerning them. The 1876 **Atlas of Indiana** (Andreas) provided the maps offering the

earliest comprehensive coverage of the field area roads, and its use did make possible some tentative analysis of the relationship between the pioneer sites and early land transportation patterns.

Similarly, while pioneer rural neighborhoods developed, the early public documents needed to locate them were either destroyed or lost in three of the research area counties. Accordingly, analysis of the pioneer rural site relationship to population concentrations was necessarily based solely on the pattern of incorporated places.

That also eliminated the possibility of effectively addressing the social factors of relatives, former neighbors, and church affiliations as issues in rural location choice. Certainly, the pioneers would be attracted to areas where people known to them and where their churches were already established. However, choice of site locations within those areas would then have reflected various environmental and economic factors.

Site Topographic Characteristics

The site topographic characteristics were defined from both field observations and data drawn from 7-1/2 minute topographic maps. Within the Lower Wabash Valley, the main streams flow over sizeable floodplains. The Wabash itself served as a spillway, and its larger tributary streams (third and higher order) have downcut and in turn established floodplains. The bluffs along the major valleys are obvious elements of the landscape, as are the extensive areas of upland with their hills and smaller first and second order v-shaped valleys.

The diverse nature of the topography occupied is apparent from the setting of the 75 early sites (Table 2). Floodplains, bluffs, and uplands were all occupied in the pioneer period, as were a variety of more specific landform features within each category. Given the widespread pioneer occupation of the area, such locational diversity was an inherent result of the settling process. Yet, there were some clear tendencies in location. For example, sites were typically chosen in areas of substantial local relief (for the region) and were positioned well above the base of the local relief.

Local relief is defined here as the difference in elevation between the adjoining topographic high and low points. Among the early site locations, its mean was 62.1 feet and the range from 10 to 140 feet. The mean site position was 65.7 percent of the local relief above the low, and the range from 5 to 100 percent. Measured in feet above the low, the site mean was 39.0 and the range from 5 to 130.

A similar measure, area relief, was developed to indicate topographic character over a slightly wider area. Instead of using the high and low elevations adjoining the site, the measure was based on the elevation difference between the highest and lowest points within a

Table 2
Site Topography and Local Relief*

Topography	Number of Sites	Mean		
		Local Relief in Feet	Feet Above Base	Percent Above Base
<u>Floodplain</u>				
Near Level**	4	67.5	6.3	12.0
Natural Levee	1	20.0	15.0	75.0
Terrace	7	41.4	20.0	53.4
Hillslope	2	107.5	42.5	41.5
Secondary Hilltop	1	10.0	10.0	100.0
Hilltop	<u>4</u>	<u>30.0</u>	<u>25.0</u>	<u>83.5</u>
All Floodplain Sites	19	48.7	20.9	52.2
<u>Bluff</u>				
Terrace	1	140.0	25.0	18.0
Slope	<u>10</u>	<u>70.5</u>	<u>25.0</u>	<u>83.5</u>
All Bluff Sites	11	76.8	25.1	42.6
<u>Upland</u>				
Valley Slope	3	45.0	52.0	23.3
Near Level**	10	74.0	60.5	75.0
Hill slopes	14	67.9	41.4	61.0
Secondary Hilltop	4	50.0	37.5	74.0
Hilltop	<u>14</u>	<u>61.1</u>	<u>59.6</u>	<u>46.6</u>
All Upland Sites	45	64.0	49.8	76.1
<u>All Sites</u>	<u>75</u>	<u>62.0</u>	<u>39.4</u>	<u>65.3</u>

* Local relief = elevation of the adjoining topographic high - elevation of the adjoining topographic low.

** Substantial elevation differences between adjoining highs and lows may occur even where the site itself is on "near level" ground.

two mile radius of the site. As would be expected, the values are higher, with a mean of 112.2 feet and a range from 25 to 200 feet.

The obvious advantages of the sizeable local relief at and near most of the sites involve variation in the immediate landscape. In addition to a visually complex, attractive view, varied hunting, fishing, gathering, grazing, and cropping opportunities should have existed near the sites. Also, different woods suitable for fuel, building,

and furniture and tool construction would probably have been available nearby.

Site position well up in the topography would reduce or eliminate flood risks, provide a more extensive view, and enhance air circulation and drainage (together important in summer cooling and insect control). The latter would have been an important factor in the health of the residents, especially where malaria was a problem. And, where hilltops were selected, the site would provide a defensible location.

The sites tended to be relatively level. No slope was apparent on 15 sites, and slopes of less than three degrees were defined at 42 others. The advantages of relatively level areas for building purposes were obviously recognized in the selection of the rural residential locations.

Slope direction (aspect) was also an apparent locational factor. Where the sites did slope, the direction was predominantly (at 58 of 60 sites) within the southern 180 degrees of arc (Fig. 3). That is, the site slope directions ranged from due east through the southern 180 degrees to due west.

One of the two exceptions was located on a Wabash River terrace which sloped to the north northwest (NNW), and the site may have been the best flood free location on the property. The other exception, also sloping NNW, was on a valley slope between a Public Land Survey boundary road and a stream. It may have been the best location providing easy access to the road on the landholding. In any event, the dominant avoidance of northern slopes suggests the importance of natural light and heating, earlier thaws, later freezes, and protection from northern winds in pioneer residential site location. Mires recorded a similar aspect pattern on early sites in Vermont.

While the distance to surface water has been described as an element in pioneer site location, it did not prove to be a consistent factor among the early area sites. With a mean of 709 feet and a range from 100 to 2,200 feet, it would appear that availability of surface water on or adjacent to the site was not a locational requirement. While it may have been necessary for households to utilize surface water for a brief time, the alternative of a well could quickly be developed. If the sites identified were those occupied after at least a year or two in the area, the well would probably have been dug by the time the site was first occupied.

It was, however, apparent that the surface water sources were near enough that livestock could be conveniently watered. And, the sites were generally close enough to the nearest streams for ready access to water transportation by canoe or piroque (an essential mode of transportation early in the pioneer period).

First order streams (the small headwater streams) were characteristically (at 62 of the 75 sites) the nearest surface water source. Second, third, or fourth order streams (stream order increases by one

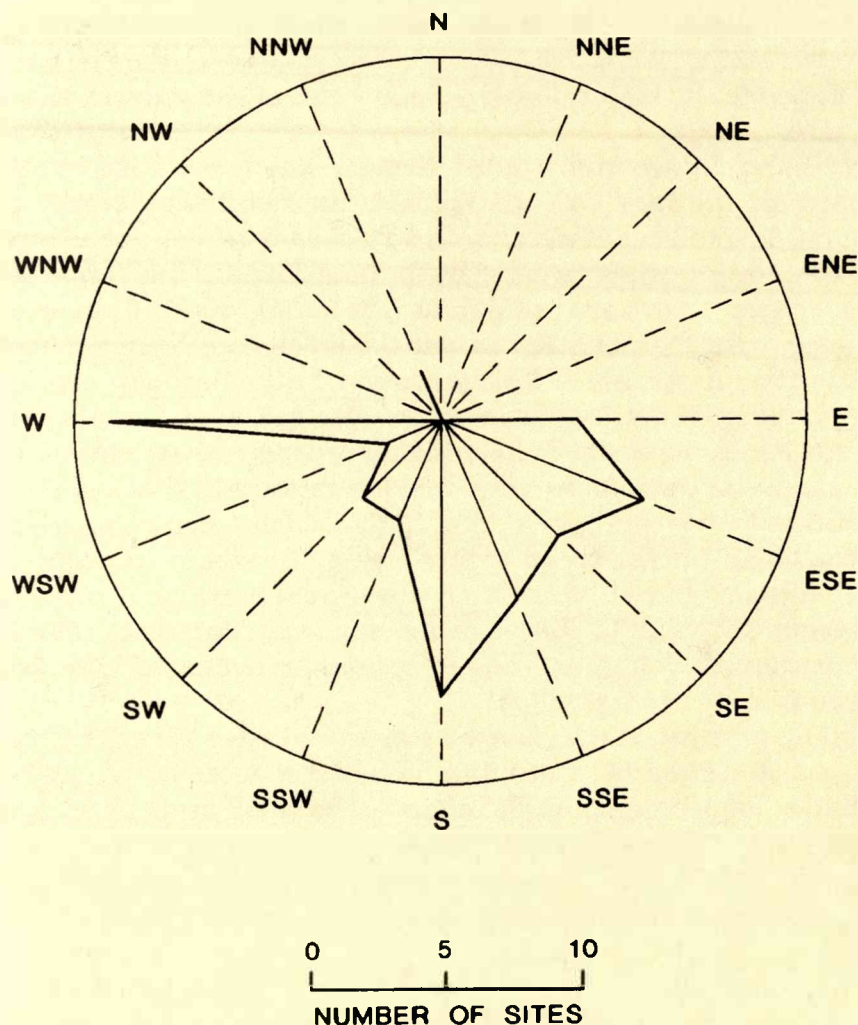


Fig. 3 Pioneer Residential Site Slope Directions.

each time streams of the same order join) were the closest surface source at the other 13 sites.

The general pioneer avoidance of sites near higher order streams would appear to be appropriate. Along third or higher order streams in the research region, the sites would normally have been on flood plains with the attendant risk of floods. If occupied before 1815, the sites would have been more exposed to attack by either native war parties or British expeditions traversing the rivers.

The sites predominantly (61 of 75) adjoined straight stream segments, 14 were nearest cut banks, and none were closest to point bars (slip off slopes). The straight stream segments apparently offered a comparative advantage. The steep cut banks would represent

access problems for both people and livestock, although they were not entirely avoided. Point bar access to streams would often be both wet and opposite the faster flowing, clear water of the current along the cut bank.

With the change from a subsistence economy to a commercial one focused on the New Orleans market, the resulting flatboat traffic required several feet of water flow. Yet, even relatively small streams (e.g. third order) could be used by flatboats during the period of high water generated by the spring thaw (the spring "rise"). The mean site distance to third order streams was 0.8 miles and the range from 0.1 to 2.4 miles. Assembly or loading points for the flatboats would very likely have been somewhat more distant, but would not have been remote. Ready access to third or higher order streams was characteristic of most of the pioneer rural residential sites in the area (Fig. 1b).

Within the research area, 18 of 19 located pioneer water mills were concentrated on fourth or higher order streams (McGregor 1994, 128). Apparently, periods of low water would have created operating problems for mills on lower order streams. The distance to mill streams (fourth or higher order) from the sites averaged 1.3 miles and ranged from 0.1 to 5.0 miles.

Thus, at most of the pioneer residential sites identified, nearby access to mill streams, and subsequent water access to the mills, was available. Pioneer water mills tended to be small and closely spaced. For example, in Parke County, where mill site identification was most complete within the research region, pioneer water mill spacing ranged from 3 to 10 miles along the suitable streams (McGregor 1992, 26).

Site Soil Characteristics

The soils at the early residential sites also varied widely (Table 3). Their suitability for dwellings was suggested in the county soil surveys for Knox, Vermillion, and Vigo counties (United States Department of Agriculture Soil Conservation Service 1974, 101-113; 1978, 93-96; 1981, 130-133). In them, soil ratings were provided in terms of restrictions for either "residential development" or "dwellings without basements." These structural categories were closest among those listed to the types of small buildings which characterized the early pioneer residences and farmsteads. Where the soil restriction ratings by county differed, as they did for four soils (AlB2, FoB2, RuB2, and FeA), the highest indicated levels of soil restriction were utilized to fully portray their problems for residential site use.

It was possible to rate the soils at 71 of the 75 sites located. At the other four, more than one soil type occurred on the site area. Those sites were excluded from the analysis of soils selected for rural

Table 3
Soil Restrictions at Residential Sites

Slight Restriction		Number of Sites			
AdB	Ade loamy fine sand, 2-6%				1
AnB	Alvin fine sandy loam, 2-6%				2
BlB	Bloomfield loamy fine sand, 2-10%				5
CdA	Camden silt loam				1
ChC	Chelsea loamy fine sand, 4-10%				2
ElA	Elston sandy loam, 0-3%				4
HoB2	Hosmer silt loam				1
PrB	Princeton fine sandy loam, 2-6%				2
SdA	Stockland sandy loam, 0-2%				3
WcA	Warsaw silt loam, 0-2%				1
Total					22

Moderate Restriction		Number of Sites by Restriction				# of Sites
		Shrink-Swell	Slope	Compressibility	Strength	
AlA	Alford silt loam, 0-2%	1				1
AlB2	Alford silt loam, 2-6%	21			21	21
AlB3	Alford silt loam 6-12%	4	4		4	4
EkA	Elkinsville silt loam, 0-2%	2				2
FcA	Fincastle silt loam			1	1	1
MuA	Muren silt loam, 0-2%			2	2	2
MuB2	Muren silt loam, 2-5%			1	1	1
OcA	Ockley silt loam, 0-2%	1			1	1
OcB	Ockley silt loam, 2-5%	1			1	1
RuB2	Russell silt loam, 2-4%	1				1
SyB2	Sylvan silt loam, 2-6%	3				3
Total		34	4	6	33	39

Severe Restriction		Number of Sites by Restriction			# of Sites
		Wetness	Strength		
Ay	Ayrshire fine sandy loam, 2-4%	1			1
FcA	Fincastle silt loam	1			1
Ge	Genesee silt loam	1			1
Ra	Ragsdale silt loam	1			1
ReA	Reesville silt loam, 0-2%	5			5
Wx	Whittaker loam	1	1		1
Total		10	1		10

pioneer occupation. Since the early buildings no longer existed on the sites, it was not possible to determine from a surface survey which soils on the sites were actually selected as locations for the structures.

At 22 of the sites the restrictions were "slight" and there should have been few problems with pioneer structures. "Moderate" restrictions characterized 39 sites. Shrink-swell (the shrinking of soils when dry and swelling when wet) and strength (bearing strength) problems predominated, and both could have affected building foundations. Moderate slope and compressibility restrictions were indicated at relatively few sites. It would appear that soils with these moderate restrictions were also suitable for the small log and frame structures characteristic of the pioneers. At least they were widely selected for residential use, and, if not ideal, may have been the best available for the purpose on the involved landholdings.

The only "severe" restrictions on the soils selected were wetness and strength. Wetness characterized 10 sites and strength problems one. Severe soil wetness would have created problems for both wood structures and the living environment of the occupants, and soil strength difficulties for foundations. Sites with these severe restrictions would appear to have been a poor choice for occupation.

However, when soil yield characteristics were also considered, toleration of the involved problems for residential construction and use became more understandable. Since the soils at the sites extended into the surrounding fields, the issue of their fertility was also important.

The increase in "estimated average" crop yields under improved level of management with increased levels of soil restriction is obvious (Table 4). The gains at each higher level of restriction for expected corn yield are substantial, as is that for wheat if slight and moderate versus

Table 4
**Estimated Average Yield Under Improved Level of
Management by Soil Restriction and Crop
at the Pioneer Rural Residential Sites**

Soil Restriction	Average Yield, Bushels/Acre*		
	<u>Corn</u>	<u>Wheat</u>	<u>Soybeans</u>
Slight	84.8	38.5	30.7
Moderate	108.6	46.4	37.5
Severe	121.9	47.5	43.7

* Computation for each cell: Sum of the average yield by soil x number of sites on each soil / total number of sites involved.

severe restrictions are compared. While the soybean was introduced into the region in a much later time, the soybean yield data further support the premise that potential crop yields would be higher on the involved soils with each increase in level of "restriction" for residential development. Thus, there appears to have been some degree of tradeoff of greater residential site problems for higher crop yields at 49 of the 71 sites where those soil characteristics were defined.

Access to Towns and Roads

The distance of the sites from pioneer towns and villages (Fig. 1a) averaged 3.8 miles and ranged from 0.1 to 8.8 miles. The centers were platted and incorporated prior to 1830, and provided retail outlets which also served as market points for rural products. In addition, the early centers along the streams typically developed pioneer industrial complexes (McGregor 1994, 24) which required quantities of local materials for their operations.

As the pioneer settlements with their industries developed, roads and trails leading to them were also apparently established. While some allusions were made to them in the local histories, and a few early routes are known, the literature provided no systematic coverage.

The pioneer site locations did, however, exhibit a relationship to the road patterns shown in the 1876 **Atlas of Indiana** (Andreas). The nearest 1876 roads to 76.0 percent (57 of 75) of the pioneer sites were segments of the roads connecting pioneer period settlements. The mean distance of the sites to the roads was 0.4 miles, and the range 0.1 to 1.8 miles. Further, the mean distance of the other 18 sites from those main roads was 0.7 miles, and the range 0.5 to 1.4 miles. The concentration of the pioneer sites along or near the established 1876 routes between the settlements suggested that proximity to suitable overland routes connecting the communities was also a factor in the pioneer rural site selection.

Whether the pioneer period roads which did develop attracted the settlement or the settlement ultimately generated the roads remains uncertain. Perhaps both processes were at work. The roads would probably have been built to serve existing villages and the rural pioneers already located near the routes. Then, once the roads were established, other pioneers should have been attracted to sites along or near the roads.

Land Surveys and the Pioneer Sites

In most of Knox County, and adjoining areas of Gibson and Sullivan counties, early land claims from the French and British

colonial periods, as well as grants awarded by the American governor and early courts, created a nightmare of conflicting land claims. Their complexity is described in the local histories as well as the **American State Papers** (Lowrie and Clarke, 550-551).

Within that area, French long lots, 400 acre Donation Grants (authorized in 1788), 120 acre Militia Donations (authorized in 1791), and various odd lots are apparent on the topographic sheets. Initial title to these early survey areas was obtained during the colonial and pioneer periods, and many of the early landholdings were also occupied at an early date.

Among the 75 pre-1830 sites identified in this study, 39 were located on the early surveys. The remaining 36 sites were established in areas of the Public Land Survey which was developed either following resolution of the early claims or, where they were lacking, as the sole land survey.

Any of the 75 pioneer residential sites may have been established prior to formal ownership of the property. Yet, those pioneer sites which were located in areas where early surveys were intermixed with public land survey areas were predominantly placed on the early surveys. Specifically, at 32 sites there is a mix of public land survey areas and early survey areas within a radius of one mile of the site. Of these, 30 sites (94 percent) were located on an early survey area.

It would seem from that locational propensity that legal land title was a factor in the distribution of the early sites. Given the difficulties experienced in Kentucky over land titles (Cotterill, 232; Scalf, 161-164; Channing, 42-43), and the fact that many Indiana pioneers had moved from Kentucky (Rose, 208-209), the apparent concern over legal title is understandable.

Locational Scenario

A locational site scenario was developed on the basis of the observed site characteristics. The site locations were well up in the local relief, were flood free, provided good air circulation, and offered a view. The substantial local and area relief at the sites suggested a range of nearby soil and biological resources, as well as a scenic landscape.

The sites were dominantly level or gently sloping (under 3 degrees). Where site slopes did occur, they were almost universally in the southern 180 degrees of arc. The resulting benefits from a southern exposure included advantages in natural lighting, winter heating, early thawing, later freezing, and protection from northern winds.

Sites were typically closest to first order streams, thereby avoiding the flood plains and (until 1815) potentially hostile traffic along the

larger streams. The distances involved were too far for convenient household use, but would present little problem for livestock. The nearest stream segment was typically straight, thereby avoiding access at steep cut banks or wet point bars. Streams suitable for flatboat transportation (third order) and mill development (fourth order) were more distant but not remote. Virtually all the sites had close access to water transportation suitable for canoes and piroques, and thereby to mill services and retail and market points.

Soils at the sites were diverse, with an apparent trade-off made between suitability for farmstead structures and productivity. However, soils with moderate restrictions for residential construction, but relatively high potential yields were most widely utilized for farmstead locations.

Most of the sites were near pioneer towns and villages as well as suitable overland routes between the pioneer centers. The social, economic, and safety advantages of an accessible nearby settlement was apparently involved in the pioneer rural residential pattern. Legal land title was also important to the settlers, since pioneer farmsteads were predominantly located on the early survey parcels where early and late surveys were intermixed in an area.

These scenario characteristics suggested that the locations selected for the pioneer rural residential sites were generally appropriate for the purpose. Rich soils, a variety of nearby resources, access to water transportation, (perhaps) roads, flatboat, and mill streams, and a series of environmental qualities enhancing comfort and safety constitute the apparent scenario assets. Given that the American Midland pioneers as a group enjoyed almost outrageous success in woodland colonization (Jordan and Kaups, 62), it is not surprising that their site choices provided many apparent advantages for rural residential locations.

It is also apparent that they avoided locations where either risks or problems were excessive. For example, the flood prone areas along the Wabash in southern Knox County and much of Gibson County were largely unoccupied in the pioneer period. In a similar vein, steeply sloping areas were rarely utilized for rural residences.

It should be emphasized that while several of the site characteristics considered here did exhibit remarkable consistency, many exhibited substantial variation (Table 5). The very consistent southern aspect, proximity to straight first order stream segments, and preference for early survey of the sites represented the exceptions rather than the rule.

The causes of the locational variation of the sites were probably as diverse as the individual decision-makers. Differences in either past experience or individual biases with respect to some aspect of the

Table 5
Pioneer Rural Residential Site Characteristics

<u>Characteristic</u>	<u>General</u>	<u>Mean</u>	<u>Range</u>
<u>Topographic</u>			
Landforms	Diverse		
Local relief		62.1 ft.	10-140 ft.
Site position: percent above low		67.5 %	5-100%
Area relief		112.2 ft.	25-200 ft.
Level sites	15 of 75		
Slope direction	Southern 180° of arc (58 of 60 sites)		
Slope magnitude	Under 3° (42 of 60 sites)		
Distance to surface water		709 ft.	100-2,200 ft.
Order, nearest stream	First (62 of 75 sites)		
Nearest stream	Straight segment (61 sites) Cut bank (14 sites)		
Distance to water transportation	3rd or higher order stream	0.8 mi.	0.1-2.4 mi.
Distance to mill streams	4th or higher order stream	1.3 mi.	0.1-5.0 mi.
<u>Soil</u>			
Type	Diverse		
Restrictions for residential construction	Slight (22 sites), moderate (44 sites), severe (11 sites)		
Fertility	Varied		
<u>Cultural</u>			
Distance to 1876 intertown road			
Intertown road nearest site	57 sites	0.4 mi.	0.1-1.8 mi.
Secondary road nearest site	18 sites	0.7 mi.	0.5-1.4 mi.
Distance to nearest pioneer town	75 sites	3.8 mi.	0.1-8.8 mi.
Preference for early survey location (where early surveys and later public land survey areas mixed)	30 of 32 sites (94%)		

landscape could result in a diversity of locational characteristics among the selected sites.

The decision makers may also have differed in terms of their site risk assessments and their willingness to accept risks. For example, occupation of a flood plain may provide access to very fertile soils, but also involve the risk of total crop loss due to floods. Assessment of the degree of that risk and the decision to accept it would vary individually.

Land availability and cost would also have been issues. The progressive decline of unoccupied land during the pioneer period would have been a factor in site selection. The latecomers within an area would have presumably have found land costs inflated and the available premium land, such as that described in the site scenario, would have become scarce and expensive. The locational choices would have been correspondingly reduced, resulting in a dispersal of settlement into varied and less desirable locations.

As settlement progressed, the local economic environment would have also progressed from an initial subsistence economy to a commercial economy with evolving opportunities. For example, as pork packing developed in the area centers, it became increasingly possible to convert grain to pork and to drive the product to an area packing plant. Accordingly, an increasing number of sites could have become attractive for hog production. This too, could have expanded the settlement pattern and the diversity of rural site characteristics.

While the model of a single locational niche is intuitively attractive, the economic opportunities, technology, and preferences of the pioneers were varied enough to lead them to occupy diverse locations. The agricultural land quality in the research area was generally sufficient for the pioneers, who were able to develop profitable operations across much of it.

Under such conditions, the pioneers would have been able to operate as satisficers rather than maximizers (see Berry, Conkling, and Ray, 240-250; Wohlper, 537-538). Where profits from a variety of activities are sufficient, individuals often occupy locations which offer satisfactory rather than maximum returns. Under those conditions, settlers occupy varied types of location rather than a single environmental niche offering maximum returns.

A strategist behavior to generate the best long-term returns under conditions of uncertainty has also been demonstrated where environmental risks are high. In the research area, this would potentially be applicable only at flood plain locations, and would not characterize the general rural pioneer settlement pattern.

Conclusions

Returning to the stated hypotheses, site locations were not random, but selected with sufficient consistency that a general locational scenario could be developed. And, analysis of those site characteristics did lead to insights about the pioneer settling process. It was apparent that the pioneers were generally aware of site advantages for rural settlement and made their locational decisions effectively.

However, most of the research area was suitable for agriculture, and the pioneers were not restricted to locating in a single environmental niche. With the exceptions noted, the generalized characteristics defined for the pioneer rural residential site locations in the research area are appropriately viewed as locational propensities rather than locational requirements.

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